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and Berbers, etc. Whether true or not, these are certainly not new views to one acquainted with the current literature of the science.

The relationship of the members of the various races is shown by 'family trees,' an ancient and necessarily misleading device. Thus, his tree of the 'homo Caucasicus' puts the Greeks, Celts and Etruscans on one of its primary branches, along with Circassians and Dravidas, while the Teutons and Slavs are on a different branch! That on this tree are placed the Samoans, Hawaiians, Battaks and Khmer is to be explained by the author's theory of the Malayan race above referred to, which he claims and which we may allow is at present, and is likely to be, his own peculiar property.

The tree of the 'homo Americanus' becomes a mass of inconsistencies so soon as he leaves the protection of Major Powell's linguistic map. Even within its area the Kolosch and Selish are depicted as proceeding from the Eskimo! The chapter on the American race is replete with positive assertions, nearly always unsupported, for instance, the imaginary distribution of two types of skull (p. 362), the alleged impassiveness of the native character (p. 353), the 'undoubted' approximation of the American to the Mongol type, etc. It is obvious that the author has not consulted the best and most recent studies in American aboriginal ethnography; yet his chapter might have been much more uninstructive than it is.

The proof-reading is generally satisfactory, though probably a highly respected American writer will not think so when he sees himself referred to as 'Mr. Thomas Cyrus' (p. 370).

Of ethnology proper, in the sense in which it is now adopted by the leading German, French and American writers, the volume scarcely treats at all, and we may look in the Index in vain for the names of Bastian, Post, Steinmetz, Achelis, or the other distinguished representatives of that comparatively new and grand department of learning; and while Mr. Keane's book can be recommended as an industrious compilation, useful to public libraries and well put together, the warning should be distinctly uttered that its title is an error and that it bears scarcely at all on the science of ethnology.

D. G. BRINTON.

Las rocas eruptivas del suroeste de la cuenca de México. EZEQUIEL ORDOÑEZ. Boletin del Instituto Geológico de México. No. 2. México, 1895. Pp. 46.

The contents of the first bulletin of this series were briefly noted in SCIENCE, Vol. II., pp. 739-740. In this issue, Señor Ordoñez presents a very clear description of the important volcanic district of the valley of Mexico, and particularly of the volcanic group of Santa Catarina and of the volcanic rocks of the Sierra de las Cruces. Fourteen opening pages are devoted to giving an 'Idea general de la cuenca de Mexico.' The remainder of the paper, largely petrographic, gives a detailed account of the cones, lava flows, breccias and ashbeds of the southwestern part of this region of andesites, trachytes and intermediate petrographic types.

J. B. WOODWORTH.

SCIENTIFIC JOURNALS.

THE ASTROPHYSICAL JOURNAL, FEBRUARY.

THE leading article is by Prof. L. E. Jewell, upon the coincidence of solar and metallic lines and upon the appearance of lines in the spectra of the electric arc and the sun. When compared with corresponding solar lines, the metallic lines of the arc spectra have been found to be almost invariably displaced toward the violet. There is, moreover, a difference in the amount of displacement of lines belonging to the same element; the greatest shift being observed in the strongest lines.

An explanation for this was sought in the difference between the condition of matter in the arc and in the solar atmosphere. This difference is probably that of pressure or density of material and temperature, or both.

The lines least displaced were those not easily reversed and visible only at a high temperature or when a large amount of material was used. As the solar lines agree most nearly with the lines produced in the center of the arc, where the temperature and density are high, we have the means of determining the pressure or the temperature of the solar atmosphere, where the Fraunhofer lines are produced, if we can separate the effects of temperature and pressure.

Several lines of investigation lead to the con-

elusion that the wave-length is affected little, if any, by changes of temperature.

The effect of pressure and amount of material used, is discussed in the next article by W. J. Humphreys and J. F. Mohler. Their results corroborate those of former investigators, that an increase of the quantity of material in the arc generally produces a slightly unsymmetrical broadening towards the red, and that increased pressure causes a similar effect; but they find in addition that, upon the application of pressure, a decided shift of the lines toward the less refrangible portion of the spectrum takes place, not due to broadening.

The change in the case of any one element is approximately proportional to the wave-length and to the excess of pressure above one atmosphere. Whether the same law holds for very low pressures could not be determined. The shift for different metals at a pressure of fourteen atmospheres often amounted to from five to ten hundredths of an Ångström unit.

Theoretical considerations indicate that the shift is inversely proportional to the absolute temperature of the melting point. There is, besides, a connection between the shifts and the atomic weights.

A third paper, by the authors of the first two, contains a discussion of the effect of pressure upon the reversing layer of the solar atmosphere. Assuming the atmosphere to be quiescent and the shifts to be due to change of pressure only, they find the pressure of the reversing layer to vary from two to seven atmospheres, according to the weight of the element observed. This seems to indicate that the upper limits of the reversing layers of the different elements are arranged somewhat in the order of their atomic weights.

THE AMERICAN GEOLOGIST, MARCH.

Biographical Sketch of Charles Wachsmuth: By C. R. KEYES. Dr. Wachsmuth was known as the foremost authority on fossil crinoids in America, if not in the world. He spent most of his life in Burlington, Iowa, where he first acquired an interest in crinoids and where he died on February 7, 1896, in his sixty-seventh year. The sketch is accompanied by a portrait.

The Structure of Certain Paleozoic Barnacles:

By J. M. CLARKE. The genus of fossil barnacles called *Lepidocoleus*, which occurs in the lower and upper Silurian and lower Devonian, is shown to be a primitive and unmodified type of cirripede structure, consisting of but two vertical ranges of plates, both series terminating in a single plate which is axial and caudal. The dorsal margin of the body is closed by the interlocking of the plates, but the ventral margin is closed only by their apposition and was dehiscent for the protrusion of the appendages.

The Mineral Deposits of Eastern California: By H. W. FAIRBANKS. The ore deposits discussed are chiefly those of gold and silver, the occurrence of the former being treated in considerable detail. The gold-bearing quartz veins are considered as unquestionably of fissure origin, and the contents of these veins bear no particular relation to the mineral composition of the country rock.

Note on the Discovery of a Sessile Conularia—Article I: By R. RUEDEMANN. The author has found in the lowest part of the Utica shale some specimens of *Conularia gracilis* Hall, to which are attached peculiar cuneiform fossils, and he has also found similar forms on two specimens of the shell of *Trochonema*. Evidence is presented to show that these peculiar forms are the young of *C. gracilis*, as is also the so-called plant, *Sphenothallus angustifolius* Hall. These young individuals of *Conularia* were not free but attached, and it is probable that the adult forms were also sessile, although attached adult specimens have not yet been found.

A New Titanichthys: By E. W. CLAYPOLE. The new form is much smaller than the other species of the genus and is named *Titanichthys brevis*. It was found by Dr. Clark, who has discovered so many fossil fish in the Devonian of Ohio.

Thickness of the Paleozoic Rocks in the Mississippi Basin: By C. R. KEYES. The estimate made by various geologists of the Paleozoic rocks of the Mississippi basin are given, and attention is called to the fact that the estimates of later years are considerably lower than the others. A recent deep boring at Kansas City, which is in the region of greatest thickness of the Paleozoic, has passed through the entire (with the exception of a part of the upper Coal meas-

ures) Paleozoic column, and entered mica schist, which is regarded as Archean in age. Estimates from this boring give about 3,000 feet as the total thickness of the Paleozoic.

Microscopic Characters of the Fisher Meteorite (Minnesota No. 1): By N. H. WINCHELL. This meteorite fell in Polk County, in northwestern Minnesota, April 9, 1894. It is a chondritic stone made up largely of olivine and enstatite, and contains a comparatively small amount of iron. Two apparently isotropic substances occur in the meteorite, one of which may be maskelynite; but the conclusions concerning these substances and the chemical composition of the stone will be discussed in a later paper.

The number closes with the usual reviews and notes. Of special interest, however, is the review of Nordenskjöld's important paper on the Swedish hällefintas, largely pre-Cambrian lavas. In this review are some interesting remarks concerning the devitrification of glass, and reference is made to some phenomena of devitrification recently observed at Bryn Mawr College.

SOCIETIES AND ACADEMIES.

PHILOSOPHICAL SOCIETY OF WASHINGTON, FEBRUARY 29, 1896.

DR. J. WALTER FEWKES read a communication on the Prehistoric Culture of Tusayan. He regarded archaeology as the only means of obtaining accurate knowledge in regard to the subject, and considered documentary history, study of surviving legends and modern practices as tributary and necessary sources of information. Archaeological evidences of the character of ancient life in Tusayan were drawn from excavations at Sikiyatki, a ruined pueblo near Walpi, which was investigated by an expedition sent out last summer by the Smithsonian Institution under the lead of the speaker. The material unearthed from this ruin was a large collection of pottery of rare excellence and many objects illustrative of prehistoric Tusayan industries.

The evidences that Sikiyatki was overthrown previous to the coming of the Spaniards into Tusayan in the middle of the sixteenth century were discussed, and shown to amply prove that the pueblo was destroyed in prehistoric times.

The great value of the objects from this ruin was therefore held to be that they indicate prehistoric culture, without European influences. The ceramics of Sikiyatki are far superior to modern Tusayan pottery, and excel in fineness of ware, symmetry of form and artistic beauty of decoration those of any aboriginal tribe of America north of Mexico.

The reason of the fineness of this ware and the possibility that coal was used in firing it were discussed. The identity of prehistoric and modern mortuary customs, as indicated by the objects taken from Sikiyatki graves, was interpreted to mean a similarity of ancient conceptions of death and a future life. Current modern beliefs on this subject were discussed and applied to an interpretation of ancient customs.

It was held by the speaker that the symbolic designs on this ancient pottery should be considered a body of prehistoric picture writing or paleography, and that the aim of the student should be to interpret it. He likened this symbolism to ancient records, and claimed that from them could be obtained a knowledge of mythological conceptions and ancestral rituals. The pictures of several animistic and other gods still recognized in modern Tusayan mythology were instanced and compared with modern figures. This ancient pictography likewise shows the antiquity of peculiar methods of dressing the hair.

The resemblance of certain geometric designs to those on the pottery from the great ruins of the Gila valley and the cliff dwellings of the Mesa Verde was pointed out and the importance of such likeness discussed.

Dr. Fewkes spoke of a large number of mortuary prayer-sticks or pahos in Sikiyatki graves, which he compared with modern and found a great conservatism in their form, size, color and appendages. He believed these resemblances meant a similarity in ancient and modern conceptions of the priests who made them. The existence of other ceremonial paraphernalia, identical with those still used in the modern Tusayan ritual, was likewise pointed out. A knowledge of modern mythology and ritual he regarded as necessary for anyone who would do good work on the archaeology of the Southwest.